

# SOLID OXIDE FUEL CELL STACK ASSEMBLY HAVING TAPERED

## DIFFUSION LAYERS

### Cross-Reference to Related Applications

[00001] This application is a continuation-in-part of U.S. Patent Application Serial No. 09/992,272, filed on November 14, 2001 which claims the benefit of U.S. Provisional Application Serial No. 60/249,098, filed on November 15, 2000, and also claims the benefit of U.S. Provisional Application Serial No. 60/413,858, filed on September 26, 2002.

### Field of the Invention

[00002] The present invention relates generally to electrochemical systems, such as solid-oxide electrolyte fuel cells and fuel cell assemblies for directly converting chemical energy into electricity. More particularly, the present invention relates to a modified fuel cell system having modified diffusion layers and seals.

### Description of the Prior Art

[00003] Planar, or flat, solid oxide fuel cell stacks are well known in the electrochemical industry. Generally, a fuel cell is an electrochemical device that combines a fuel, such as hydrogen, with oxygen to produce electric power, heat and water. The solid oxide fuel cell consists of an anode, a cathode and an electrolyte. The anode and cathode are porous, thereby allowing gases to pass through them. The electrolyte, located between the anode and cathode, is permeable only to oxygen ions as they pass from the cathode to the anode. The passing of the oxygen ions through the electrolyte creates an excess of electrons on the anode side to complete an electrical circuit through an external load to the cathode side, which is electron deficient.

[00004] A solid oxide fuel cell is quite advantageous over conventional power generation systems. It is known in the electrochemical industry that such devices are capable of